Antarctica, where turrids and whelks converge: A revision of *Falsimohnia* Powell, 1951 (Neogastropoda: Buccinoidea) and a description of a new genus

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ABSTRACT

A study of the type material of Antarctic species of conoideans described by Herman Strebel revealed that four species, all originally described in the genus *Bela* Gray, 1847 (Mangeliidae), are referable to the superfamily Buccinoidea based on radular morphology. Three of the species: *B. fluvicans*, *B. minor*, and *B. anderssoni* are transferred to the genus *Falsimohnia*, which is here reviewed. The new buccinoidean genus *Strebela* is proposed for the species originally described as *Bela notophila*. Of the five species of the conchologically similar genus *Pareuthria* Strebel, 1905 that have been recorded within the Antarctic Convergence, two, *Pareuthria innocens* (Smith, 1907) and *P. hoshiaii* Numanami, 1996, are transferred to the genus *Falsimohnia* based on radular morphology. The appropriate generic allocation of *Pareuthria plicata* Thiele, 1912 is not yet clear; however, major differences in radular morphology exclude it from the genus *Pareuthria*. The taxa *Pareuthria valdiviae* (Thiele, 1925) and *Pareuthria turriformis* Egorova, 1982 are presently known only from their shell morphology. We suggest that they will be referred to other genera when anatomical material becomes available, and that the genus *Pareuthria* will be limited to the Magellanic region.

Additional Keywords: Gastropoda, Conoidea, Buccinoidea, Antarctic Convergence, biogeography, morphological convergence

INTRODUCTION

Despite numerous and ongoing research programs that have been sampling areas of the Southern Ocean for more than a century, many of the species of Neogastropoda described from Antarctic waters are known from a small number of specimens, and a considerable proportion of the taxa have yet to be re-sampled since their original description. Therefore, it is not surprising that some of the smaller species, especially those having narrow distributions, remain poorly studied. Among the insufficiently studied groups within Antarctic waters are the Conoidea. This superfamily is one of the most diverse clades of Neogastropoda (Bouchet, et al., 2002; Bouchet, et al., 2009), particularly in the tropics. The classification of the superfamily Conoidea has recently been revised based on radular morphology (Tucker and Tenorio, 2009) and molecular phylogeny (Puillandre et al., 2011), and now includes 15 families (Bouchet et al., 2011). Thirteen of these families had previously been included in a single family, the Turridae, which emerged as paraphyletic in the phylogenetic analysis. These 13 families are collectively referred to here as "turrids". Currently, about 460 conoidean genera and subgenera are recognized, 358 of which belong to "turrid" families and encompass more than 4000 named Recent species (Tucker, 2004), with many hundreds of species still unnamed (Bouchet, et al., 2009).

The diversity of turrids decreases significantly in high latitudes. Only about 40 species are known to inhabit the waters of the Arctic Ocean (Kantor and Sysoev, 2006). The diversity of turrids in Antarctic and subAntarctic waters is also very low. At present, 37 named species have been recorded from the Southern Ocean (Engl, 2012), although there are still new species to be discovered and named. Remarkably, the number of presently recognized Arctic and Antarctic turrids is nearly the same.

The majority of the known Antarctic turrids were described in publications based on the large Antarctic expeditions of the early 20th Century (Strebel, 1908, Thiele, 1912, Hedley, 1916). Hermann Strebel (1908) described numerous gastropods using material collected by the Swedish Antarctic Expedition (1901–1903) under the command of Otto Nordenskjöld. Among these were 11 new species of turrids, of which ten were from within the Antarctic Convergence (Strebel, 1908:87), the highest number of species of Antarctic Conoidea to be described in a single publication. All of the species described by

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Strebel were considered valid by most subsequent authors (e.g., Powell, 1951, Engl, 2012). Five of Strebel's species are rather common in collections and are often referred to in the literature. Of these, four serve as type species of subsequently described genera:

- *Surcula magnifica* Strebel, 1908 (=*Aforia magnifica*, family Cochlespiridae Powell, 1942)
- *Bela antarctica* Strebel, 1908 (= *Conorbela antarctica*, type species of the genus *Conorbela* Powell, 1951, family Pseudomelatomidae Morrison, 1965)
- *Bela pelseneri* Strebel, 1908 (= *Propebela (Lorabela) pelseneri*, type species of the subgenus *Lorabela* Powell, 1951, family Mangeliidae P. Fischer, 1883)
- *Bela purissima* Strebel, 1908 (= *Typhlodaphne purissima*, type species of the genus *Typhlodaphne* Powell, 1951, family Borsoniidae A. Bellardi, 1875).
- *Bela turrita* Strebel, 1908 (=*Belaturricula turrita turrita*, type species of the genus *Belaturricula* Powell, 1951, family Borsoniidae)

The remaining five Antarctic species described by Strebel (1908) as turrids are less well known, and all but *Pleurotomella bathybia* are reviewed here. Thanks to the courtesy of Dr. Anders Warén we were able to study the type material of Strebel's species in the collections of the Swedish Museum of Natural History, Stockholm, including the radulae of three of the species.

The holotype of *Pleurotomella bathybia* had been lost some time ago, and a neotype (ZSM Mol 2002 1313) has only recently been designated (Engl, 2012: 185, pl. 76, fig. 2a) from off South Georgia, near the locality where Strebel's holotype was collected. As this taxon is presently known only from its shell and protoconch morphology, it is provisionally retained within Conoidea.

The radulae and shell characters of the four species treated herein (all originally described in the turrid genus *Bela*) clearly demonstrate that these taxa belong in the superfamily Buccinoidea. Radular morphology indicates a close affinity to the genus *Falsimohnia* Powell, 1951. In this paper we review the genus *Falsimohnia* and include a redescription of four of Strebel's species.

MATERIALS AND METHODS

The type specimens of species described by Strebel are housed in Swedish Museum of Natural History. We also examined specimens from the Muséum national d'Histoire naturelle, and the Institute Royal des Sciences Naturelles de Belgique for comparative purposes.

Radulae were cleaned with diluted bleach (1 part of commercially available bleach to 3–4 parts of distilled water), mounted on round glass cover slips and air-dried. Cover slips were then mounted onto SEM stubs, coated with gold and examined under a JEOL JSM 840A scanning electron microscope. Abbreviations used in text: AL: Aperture length; AW: Aperture width; IRSN: Institute Royal des Sciences Naturelles de Belgique, Brussels; MNHN: Muséum national d'Histoire naturelle, Paris; NHMUK: The Natural History Museum, London; SL: Shell length; SMNH: Swedish Museum of Natural History, Stockholm; ZMB: Zoological Museum of Berlin, Berlin; ZSM, Zoologische Staatssammlung München, Munich.

SYSTEMATICS

Class Gastropoda Cuvier, 1797
Order Neogastropoda Wenz, 1938
Superfamily Buccinoidea Rafinesque, 1815
Family Buccinulidae Finlay, 1928
Subfamily Cominellinae Gray, 1857

Genus *Falsimohnia* Powell, 1951

Falsimohnia Powell, 1951: 137; Engl, 2012:145.

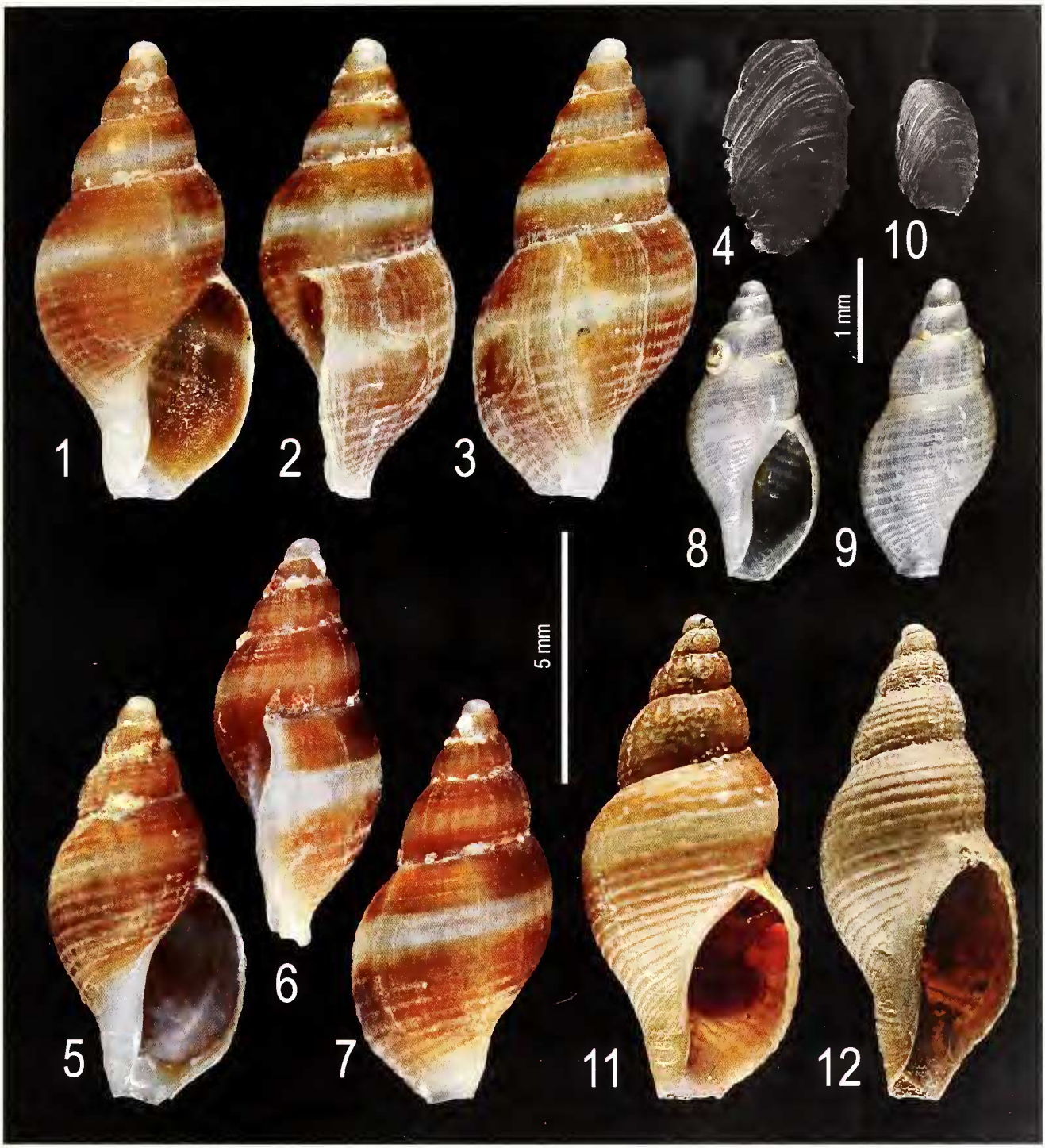
Type Species: *Buccinum albozonatum* Watson, 1882:358, by original designation.

Description: Shell small to medium-sized (to 12 mm), broadly fusiform, with high, convex last whorl and short to slightly attenuated canal. Protoconch paucispiral, smooth. Spiral sculpture usually of well-defined cords, covering entire shell surface. Axial sculpture of weakly pronounced, low, narrow, broadly spaced, and slightly sigmoidal axial ribs most prominent on spire whorls. Operculum oval, with terminal or subcentral nucleus, situated in the lower corner of operculum. Radula with rachidian teeth nearly as long as wide, V-shaped, with deep anterior notch and long, single, medial cusp emanating from posterior edge. Lateral teeth with long basal plate bearing two long, curved cusps near middle and inner margin of tooth. Outer portion of basal plate tapered, without cusps. Outer cusp broader, longer, inner cusp shorter, generally more curved.

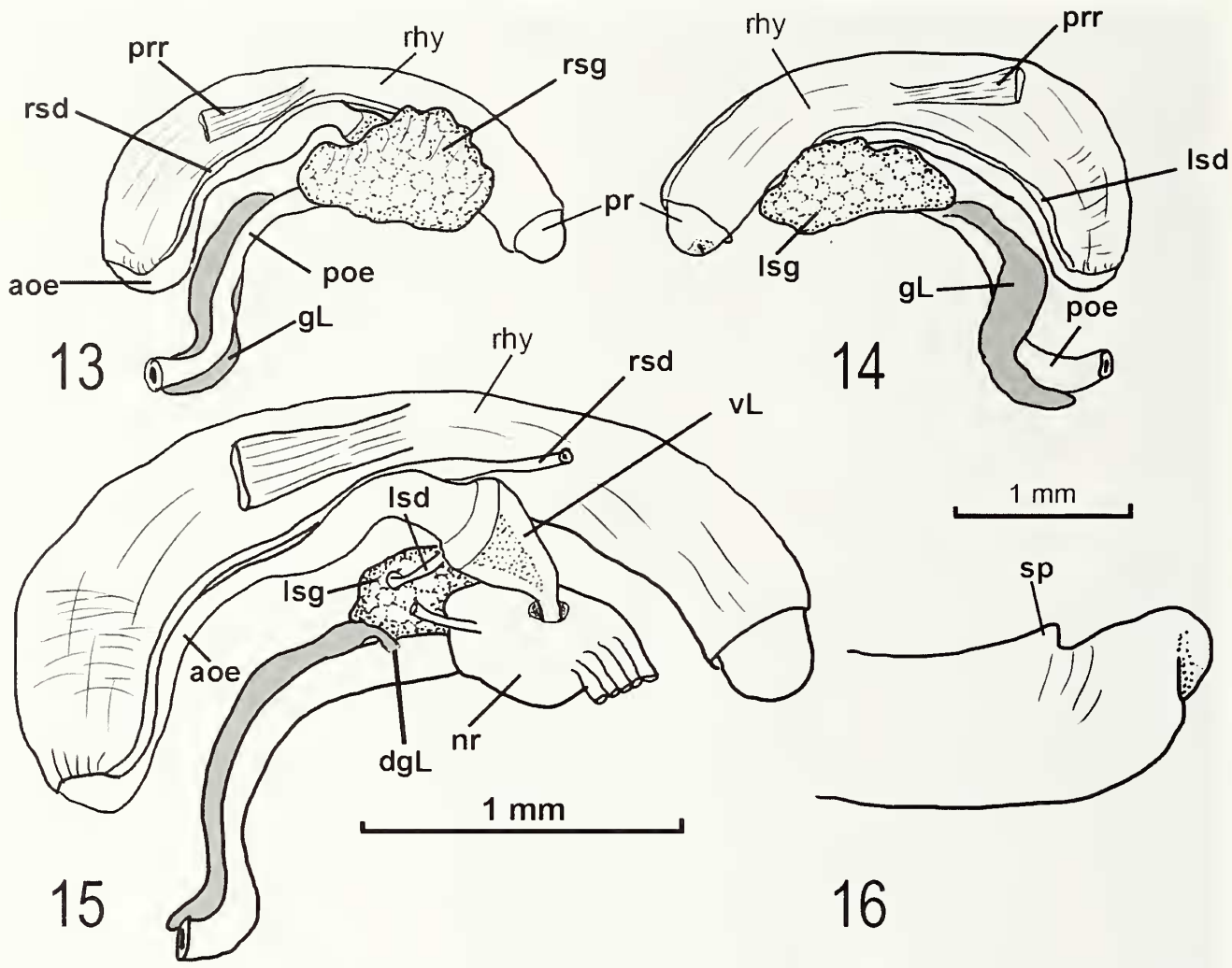
Remarks: Powell (1951: 137) based his monotypical genus *Falsimohnia* entirely on radular characters as a "derivative of *Pareuthria* in which the normal three cusps of the central tooth have been reduced to a single member", noting also the similarity in the opercula of the two genera. He designated *Buccinum albozonatum* Watson, 1882 from Kerguelen Island as the type species, and went on to diagnose this genus by emphasizing conchological similarities with the genera *Pareuthria* Strebel, 1905 and *Glypteuthria* Strebel, 1905, but explicitly differentiated *Falsimohnia* on the basis of its having a radula similar to that of the Arctic genus *Mohnia* Friele, 1878, in which the rachidian tooth has a single cusp and the lateral teeth are bicuspid. The description of *Falsimohnia* did not provide any additional conchological or anatomical diagnosis.

Falsimohnia albozonata (Watson, 1882)
(Figs 1–7, 13–19)

Buccinum albozonatum Watson, 1882: 358; Watson, 1886: 212, pl. 13, fig. 7.



Figures 1–12. Species of *Falsimolnia*. **1–7.** *Falsimolnia albozonata* (Watson, 1882). **1–3.** Shell, and **4.** operculum, MNHN uncataloged, Kerguelen Islands, Iles Nuageuses, R/V Marion Dufresne, cruise 04, st. CP17, 48°47,1′ S, 68°49.3′ E, 70 m, (SL = 9.2 mm). **5–7.** IRSN, IG 26482, Kerguelen Islands, S of Ile Suhin, 40 m, (SL = 8.2 mm). **8–10.** *Falsimolnia* cf. *albozonata*. **8–9.** Shell and **10.** operculum, MNHN uncataloged, Crozet Islands, R/V Marion Dufresne, cruise 03, st. CP17, 46°24′ S, 51°59′ E, 180 m, (SL = 6.0 mm). **11–12.** *Lachesis australis* Martens and Thiele, 1904. ZMB 59955, Syntypes. **11.** This syntype (ZMB 59955a) is designated as the lectotype of *Lachesis australis* Martens and Thiele, 1904, herein. **12.** This syntype (ZMB 59955b) becomes the paralectotype of *L. australis*. The 5 mm scale bar applies to all shells, the 1 mm scale bar applies to opercula.



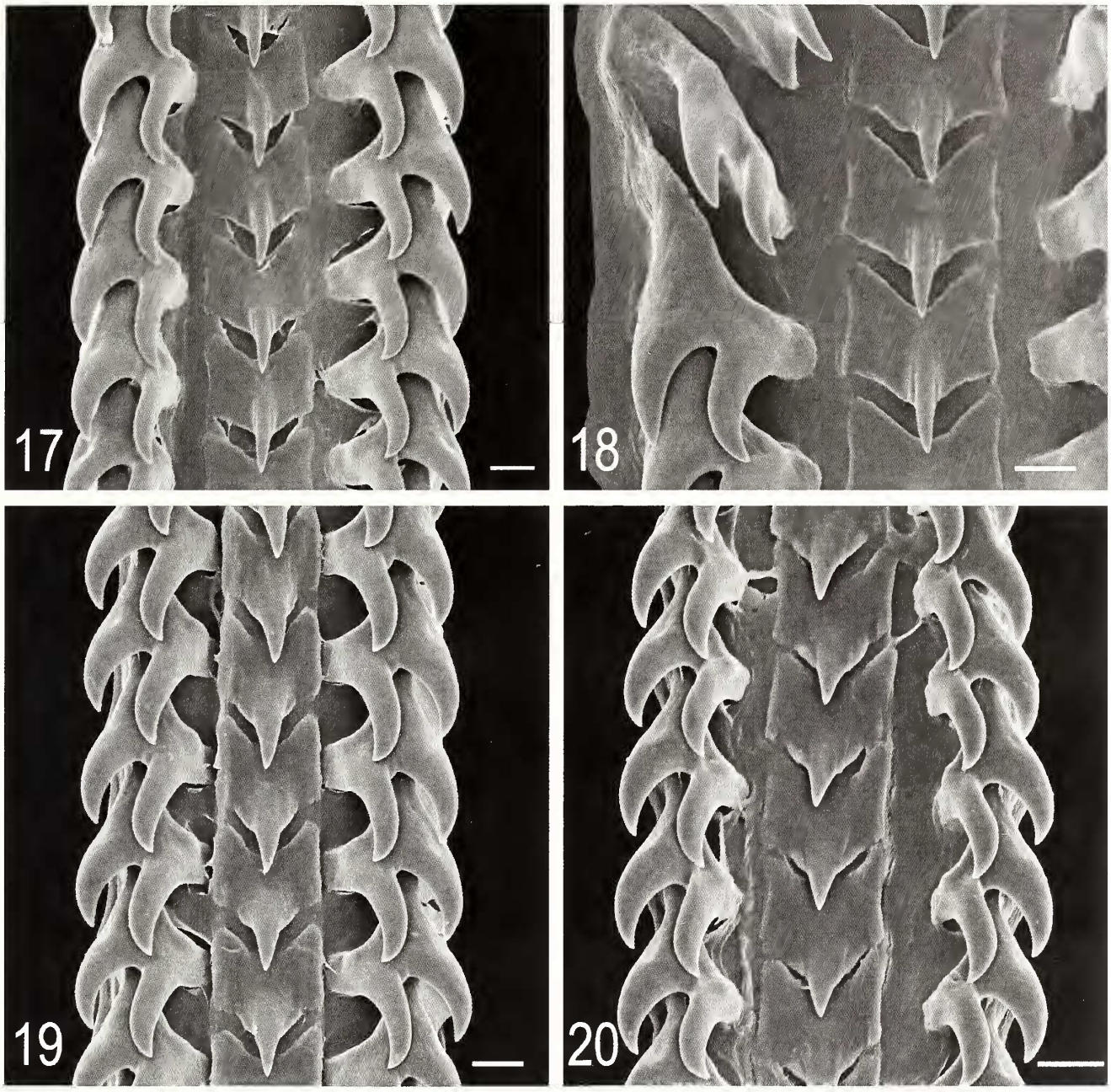
Figures 13–16. Anatomy of *Falsimohnia albozonata*. **13.** Right lateral and **14.** left lateral views of the anterior foregut. **15.** Right lateral view or anterior foregut with right salivary gland removed to show the duct of the gland of Leiblein and valve of Leiblein. **16.** Detail of distal end of penis. **aoe**, anterior oesophagus; **dgl**, duct of the gland of Leiblein; **gL**, gland of Leiblein; **lsd**, duct of the left salivary gland; **lsg**, left salivary gland; **nr**, circumoesophageal nerve ring; **poe**, posterior oesophagus; **pr**, proboscis; **prr**, proboscis retractors; **rhy**, rhynchodaeum; **rsd**, duct of the right salivary gland; **rsg**, right salivary gland; **sp**, seminal papilla; **vL**, valve of Leiblein.

Lachesis? australis Martens and Thiele, 1904: 62, pl. 5, fig. 18.
Pareuthria albozonata—Thiele, 1912: 244.
Falsimohnia albozonata—Powell, 1951: 138.
? *Mangelia nigropunctata* Martens, 1885: 91-92.
? *Mangelia antarctica* Martens and Pfeffer, 1886: pl. 1, figs. 5 a, b.

Type Localities: Royal Sound, Kerguelen Islands, 49°28′ S, 70°13′ E, 28 fms [51 m] (*B. albozonatum*); Kerguelen Islands (*L. australis*); South Georgia (*M. nigropunctata, M. antarctica*).

Material Examined:, IRSN IG 26482, Kerguelen Islands, S of Ile Suhin, 40 m, 3 live, 1 dissected (Figures 1 E–G); MNHN, uncataloged, Kerguelen Islands, Iles Nuageuses, R/V Marion Dufresne, cruise 04, st. CP17, 48°47.1′ S, 68°49.3′ E, 70 m (Figures 1 A–D); MNHN, uncataloged, Crozet Islands, R/V Marion Dufresne, cruise 30, st. DC60, 46°25′ S, 50°22′ E, 105-120 m (11 dead); MNHN, uncataloged, Crozet Islands, R/V Marion Dufresne, cruise 03, st. CP17, 46°24′ S, 51°59′ E, 180 m (1 live, radula examined, light form) (Figures 8–10).

Description: Shell medium-sized (to 10 mm), strong, broadly fusiform, with evenly convex whorls and short, broad siphonal canal. Protoconch rounded, smooth, paucispiral. Axial sculpture limited to growth lines, occasionally with narrow, broadly spaced, low, slightly prosocline ribs more pronounced on upper teleoconch whorls. Spiral sculpture of low rounded cords (9–11 on penultimate whorl, 16–19 on last whorl) slightly



Figures 17–20. *Falsimohnia albozonata* radulae. **17–18.** Radula of specimen in figures 1–3, MNHN uncataloged, Kerguelen Islands, Iles Nuageuses, *Marion Dufresney*, cruise 04, st. CP17, 48°47,1′ S, 68°49.3′ E, 70 m. **19.** Radula of specimen in figures 5–7, IRSN, IG 26482, Kerguelen Islands, S of Ile Suhin, 40 m. **20.** *Falsimohnia* cf *albozonata*. Radula of specimen in figures 8–9, MNHN uncataloged, Crozet Islands, R/V Marion Dufresne, cruise 03, st. CP17, 46°24′ S, 51°59′ E, 180 m. Scale bars = 10 µm.

narrower that the interstices. Aperture elongated (AL/SL ≈ 0.55–0.57), narrow (AL/AW ≈ 2.2), elliptical, with narrow callus extending onto parietal and columellar regions of inner lip. Operculum oval, with terminal nucleus. Periostracum thin, tightly adherent, transparent. Shell light brown to rust-colored, with a characteristic whitish spiral band along shell periphery, whitish columella and siphonal canal.

Gross Anatomy: Last whorl of the animal of a single specimen (IRSN IG 26482, SL 8.2 mm) was extracted from the shell and dissected. Preserved tissues lack pigmentation. Foot short, truncated posteriorly, operculum missing, likely lost during fixation (opercular disk distinct). Mantle cavity deep (L/W ≈ 2), mantle edge did not cover head. Siphon short, very broad. Head small, with long, closely spaced tentacles, large, brown eyes on

very small lobes at tentacle bases. Disposition of mantle cavity organs typical for Buccinoidea. Ctenidium narrow, spanning ¾ of mantle cavity, osphradium equal in width to ctenidium, slightly shorter. Hypobranchial gland without distinct folds. Rectum very short, broad. Proboscis (Figure 14, pr) long, narrow, about 3.2 mm in length (0.7 AL). Proboscis retractor muscles (Figures 13, 14, prr) very thin, paired, symmetrical, attached to rhynchodaeum (Figures 13–15, rhy) at mid-length. Salivary glands (Figures 13, rsg, 14, 15, lsg) medium-sized, oval, fused ventral to rhynchodaeum, covering nerve ring (Figure 15, nr) and most of valve of Leiblein (Figure 15, vL). Salivary ducts (Figures 13, rsd, 14,15, lsd) very thick, running along both sides of anterior oesophagus. Valve of Leiblein well defined, conical. Gland of Leiblein (Figures 13, 14, gL) small, simple, tubular, colorless, joins esophagus through a slightly constricted duct posterior to nerve ring. Odontophore spans ⅔ of proboscis length. Subradular cartillages fused along entire length. Radula equal to odontophore in length. Radula (Figures 17–19) narrow, about 75–90 µm wide (1.6–1.8% of AL). Lateral teeth with long base tapered toward the outer edge, with two strong, curved cusps, the inner cusp slightly shorter, emanating from the inner half of the tooth. Rachidian tooth with a V-shaped base nearly as long as wide, deeply notched anteriorly and with one strong, long cusp emanating from posterior midline of the tooth.

Remarks: We did not examine the holotype of *Buccinum albozonatum*, but studied several specimens collected close to the type locality (Kerguelen). Conchologically they are very similar to the published description (Watson, 1882) and subsequent illustrations (Watson, 1886:pl. 13, fig. 7) of this species. We do note, however, that all specimens we examined had a slightly different operculum. Watson (1886) stated that "Operculum is intermediate in form between that of *Buccinum* and *Cominella*; for, as in the latter, the nucleus is at the lower end, but it is not apical, but is within the edge towards the outer margin as in the former." In the specimens we studied, most opercula are eroded to varying degrees (Figure 4), yet their general shape indicates that their nuclei are terminal, not subcentral. In other respects the shells of the specimens examined are very similar to the figure published by Watson. The opercula of the samples we examined matched the illustration of the operculum of *F. albozonatum* that was published by Powell (1951: fig. N, 127).

Powell (1951:138) considered *Falsimohnia albozonata* to have a broad geographic range, and synonymized *Mangelia antarctica* Martens and Pfeffer, 1886 (from South Georgia Island) and *Lachesis? australis* Martens and Thiele, 1903 (from Kerguelen Island). The name *Mangelia antarctica* was unnecessary replacement name for *Mangelia nigropunctata* Martens, 1885 from South Georgia (Zelaya, 2005).

We were not able to examine the type material of *Mangelia nigropunctata*. However, Martens and Pfeffer's illustrations (1886:pl. 1, fig. 5) indicate that their taxon is very similar to *F. albozonata*, and also has the whitish spiral band along the shell periphery that is present in *F. albozonata*. As we have not found any material of *F. albozonata* from South Georgia, we cannot confirm the presence of this taxon off South Georgia, nor its status as senior synonym of *M. nigropunctata* (= *M. antarctica*).

Powell (1951: fig. K, 59) illustrated the radular dentition of a specimen collected off South Georgia Island that he attributed to *F. albozonata*. A reexamination of voucher material (station 149) identified by Powell and deposited in the Natural History Museum (NHMUK 1961499) revealed the specimens to be referable to *F. fulvicans* (see below for further discussion).

Another species that Powell (1951) considered to be a synonym of *F. albozonata* is *Lachesis australis*, also from Kerguelen. Two syntypes of *L. australis* were located in the Zoological Museum of Berlin (ZMB 59955) (Figures 11–12). One of the specimens (Figure 11) matches typical *Falsimohnia albozonata*, while the other (Figure 12) differs in having a more slender shell with a more elongated aperture and uniform coloration, lacking the whitish band along the shell periphery and siphonal canal. We examined a similar specimen from Crozet Islands (Figures 8–10) and found the radula (Figure 20) to be identical to that of typical specimens of *F. albozonata* (Figures 17–19). It is at present unclear whether the conchological differences are due to intraspecific variation, or whether the two morphotypes represent different species of *Falsimohnia*. In order to stabilize the nomenclature, we here designate the specimen illustrated in Figure 11 (ZMB 59955a) as lectotype of *Lachesis australis* Martens and Thiele, 1904. The remaining specimen (Figure 12, ZMB 59955b) becomes a paralectotype. As the lectotype has all the morphological features of *Falsimohnia albozonata*, *Lachesis australis* Martens and Thiele, 1904, is a junior subjective synonym of *Buccinum albozonatum* Watson, 1882.

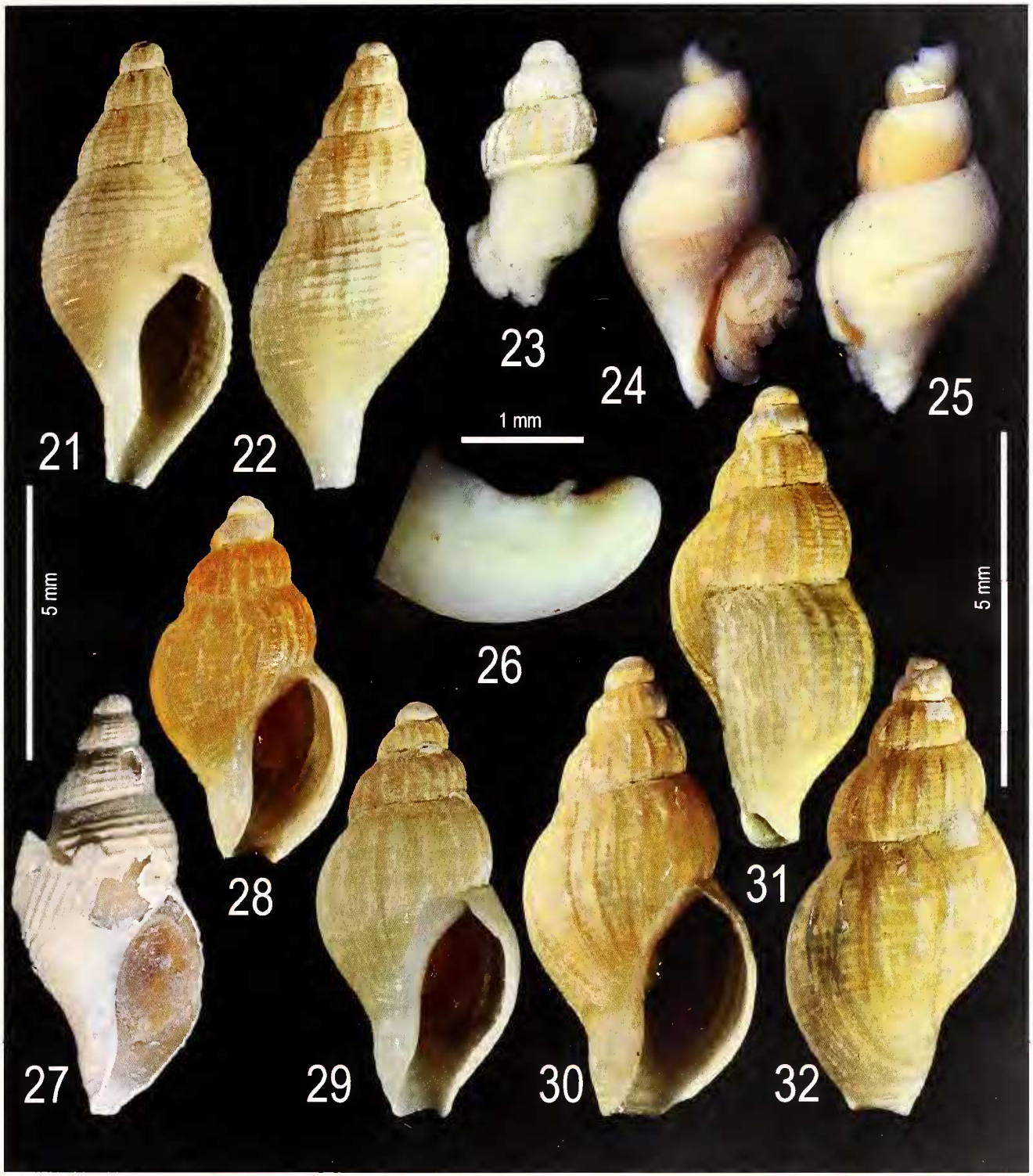
Falsimohnia fulvicans (Strebel, 1908)

(Figures 21–27, 35–36)

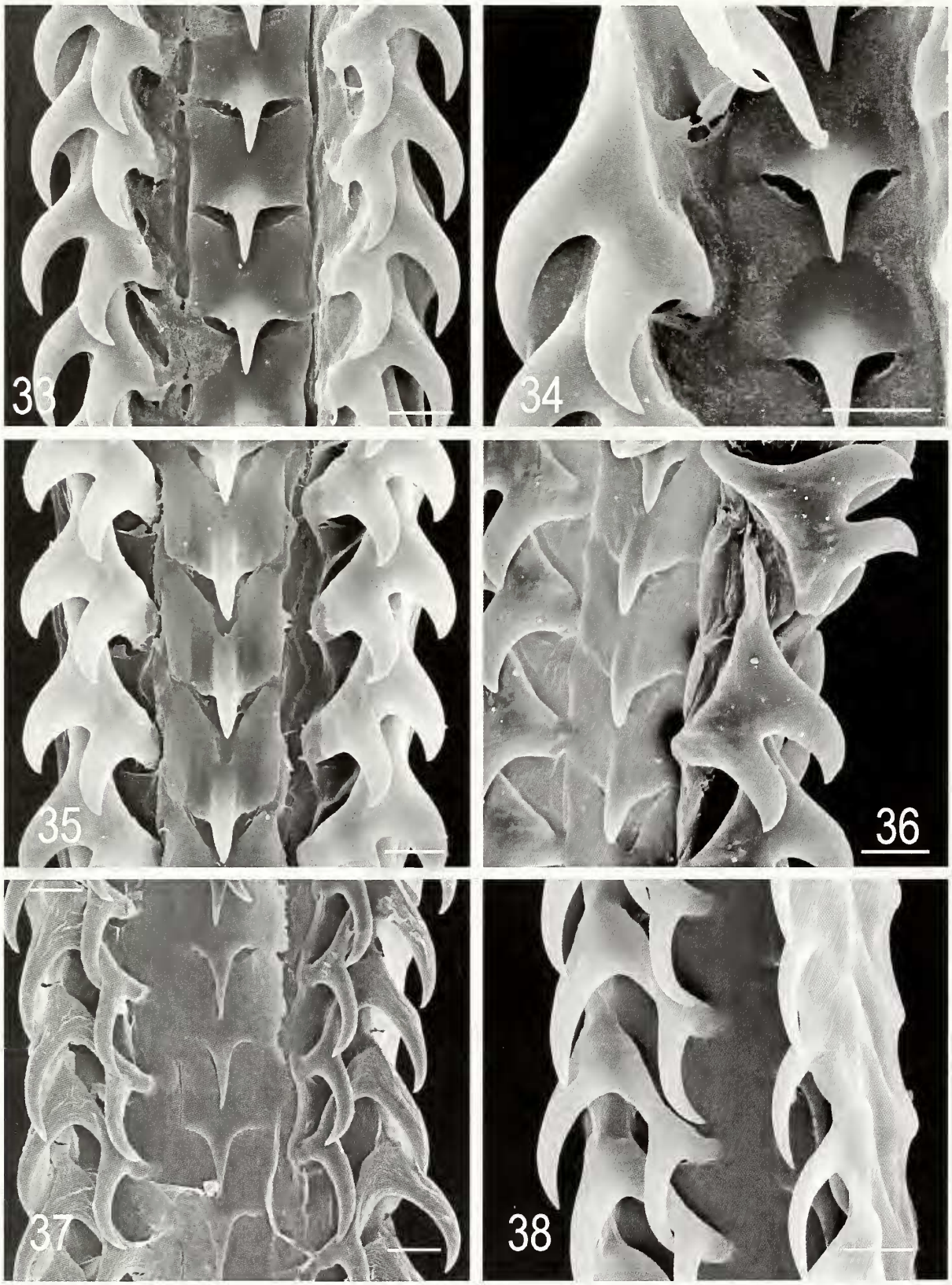
Bela fulvicans Strebel, 1908: 15, Taf. 2, fig. 25 a–d; Melvill and Standen, 1912: 356; Powell, 1951: 56 (Burwood Bank), 59 (South Georgia); Zelaya, 2005: 128, fig. 52 (figure erroneously labelled as *Lorabela pelseneeri*); Engl, 2012: 181, pl. 73, fig. 7a–c.

Type Locality: South Georgia, Cumberland Bay, outside Grytviken, 54°22′ S, 36°27′ W, 24–52 m (Swedish South Polar Expedition, sta. 25). [The coordinates provided on the printed label accompanying the specimen and in Strebel's original description are likely erroneous, as they correspond to a location on dry land close to Grytviken.]

Type Material: Lectotype, SMNH Type 6303 (designated by Engl, 2012: p. 181) (Figures 21–22). Paralectotypes: SMNH Type 1030 (st. 34, Cumberland Bay, 54°11′ S, 36°18′ W, 252–310 m) (Figures 24–26);



Figures 21–32. Species of *Falsimohnia*. **21–27.** *Falsimohnia fulvicans* (Strebel, 1908). **21–22.** Lectotype, (SMNH Type-6303), (SL 8.1 mm). **23.** Paralectotype, (SMNH Type-6159). **24–25.** Body of paralectotype (SMNH Type 1030) **26.** penis tip of paralectotype in figures 24–25. **27.** Specimen from South Georgia identified by Powell as *Falsimohnia albozonata*, NHMUK 1961499, (SL 7.6 mm). **Figures 28–32.** *Falsimohnia minor* (Strebel, 1908). Syntypes (SMNH Type-1057). **28.** (SL 5.6 mm). **29.** (SL 5.8 mm). **30–32.** (SL 6.5 mm). Left scale bar applies to figures 21,22, 27, right scale bar applies to figures 28–32. The 1mm scale bar applies to figure 26.



Figures 33–38. Radulae. **33–34.** *Falsimohnia minor* (Strebel, 1908), radula from syntype in figure 29. **35–36.** *F. fulvicans* (Strebel, 1908), radula from paralectotype in figures 24–25. (SMNH Type 1030). **37–38.** *Strebelona notophila* (Strebel, 1908), radula from holotype, Figures 44–45 (SMNH Type-1064). Scale Bars = 10 μm.

SMNH Type 6159 (st. 95, off Astrolabe Island, 64°09′ S, 58°17′ W, 95 m) (Figure 23).

Description (based on intact shell of lectotype): Shell medium-sized (to 8.1 mm), strong, thick, narrowly fusiform, with moderately convex whorls and attenuated, narrow, siphonal canal. Protoconch eroded, rounded, paucispiral. Whorls with narrow and slightly concave subsutural ramp, evenly convex along periphery. Axial sculpture of narrow, weakly sinuate and weakly prosocline ribs, extending from suture to suture on spire, becoming obsolete on periphery of last whorl (~ 15 ribs on penultimate and last whorls). Spiral sculpture of sharp, raised spiral cords. Cords (7–9 on spire whorls, ~ 18 on last whorl) broadly spaced adapically, with intervening spaces 1–2 times broader than cords. Cords become broader than intervening spaces along shell periphery, indistinct on siphonal canal. Aperture large (AL/SL ≈ 0.53), elliptical (AL/AW ≈ 2.0), with callus extending along parietal region and columella. Operculum oval, with terminal nucleus, shifted to left. Periostracum beige, tightly adhering. Shell beige, lighter on siphonal canal.

Gross Anatomy: Animal of the paralectotype with a broken shell (Figures 24–26, ♂) was dissected. Anatomy similar to *Falsimohnia albozonata* in most regards. Eyes large. Penis long, about the length of mantle cavity, dorsoventrally compressed, blunt distally with long but narrow seminal papilla shifted posteriorly, situated on dorsal edge of penis (Figure 26). Proboscis of moderate length, cylindrical, tapering distally. Radula (Figures 35–36) narrow (~60 μm wide), lateral teeth with broad base, elongated and weakly recurved outer edge, two strong cusps, inner cusp shorter, emanating from middle and inner portions of base. Central tooth with nearly square basal plate, its anterior edge V-shaped with indentation accommodating single medial cusp emerging from rounder posterior edge of anteriorly adjacent tooth. Lateral edges of basal plate of central tooth with thickened ridges parallel to central cusp, possibly vestiges of lateral cusps. Stomach with long posterior mixing area.

Remarks: The species is rather distinct, resembling the shell outline of *Probuccinum costatum* (Thiele, 1912), but differing from that taxon in having more numerous axial ribs on the shell, and a different radula. In *Probuccinum* the radula is typical buccinulid, with broad tricuspid central teeth and tricuspid lateral teeth that lack an elongated outer basal plate. *Falsimohnia fulvicans* appears to be rare, as the only confirmed record since the original description is that of Zelaya (2005). The radula of *F. fulvicans* is very similar to that of *F. albozonata* as is its penis morphology, both providing support for the transfer of this species to the genus *Falsimohnia*.

In his discussion of *F. albozonata*, Powell (1951:138) considered the range of this species to include South Georgia Island. Two specimens from *Discovery* station 149 that had been identified by Powell as *F. albozonata* (NHMUK 1961499) were examined (Figure 27). The similarity of these specimens to the lectotype of *F. fulvicans* indicates that they were misidentified as *F. albozonata* by Powell. Discovery station 149 is very close to Cumberland Bay, the type locality of *F. fulvicans*, and the depth is comparable to that from which a paralectotype of *F. fulvicans* was collected. In a survey of the Mollusca of the Burwood Bank, Melvill and Standen (1912:356) reported a single "imperfect, bleached specimen" that they tentatively identified as *Bela fulvicans*.

Distribution: South Georgia, and questionably Burwood Bank.

Falsimohnia minor Strebel, 1908
(Figures 28–34)

Bela anderssoni var. *minor*? Strebel, 1908: 15; Powell, 1951:59; Engl, 2012:181, pl. 73, fig. 6a.
Typhlodaphne innocentia Dell, 1990: Aldea and Troncoso, 2008: 82, fig. 64; Aldea and Troncoso, 2010: 144–145, fig. 157.

Bela polysarca var. *minor Locard*, 1897, *Bela pyrrhogramma* var. *minor* Locard, 1897, and *Bela anderssoni* var. *minor*? Strebel, 1908, were all proposed as taxa of subspecific rank (ICZN, 1999: Article 45.6.4). In our view, both *Bela polysarca* var. *minor Locard*, 1897 and *Bela pyrrhogramma* var. *minor* Locard, 1897 are *nomina nuda*, as neither name is accompanied by a description or definition of the taxon, nor by an indication (ICZN, 1999: Article 12). As *nomina nuda*, these names are not available names and do not enter into homonomy (ICZN, 1999: Article 54).

Type Locality: South Georgia Island, outer Cumberland Bay, 54°11′ S, 36°18′ W, 252–310 m, Swedischen Südpolar-Expedition, sta. 34.

Type Material: 3 syntypes, SMNH Type-1057.

Description: Shell small (to 6.5 mm), strong, moderately thick, with convex whorls and short broad canal, with shallow but distinct notch. Protoconch bulbous, eroded on all specimens. Profile of whorls between suture and shoulder slightly concave. Axial sculpture of narrow, slightly sinuous, nearly orthocline ribs (14–15 on penultimate and last whorls), extending from suture to suture on spire and suture to siphonal canal on last whorl. Spiral sculpture of low, sometimes indistinct, closely spaced spiral cords that are broader than intervening spaces. Aperture large (AL/SL = 0.54–0.61), moderately broad (AL/AW≈ 1.9), elliptical, inner lip with narrow callus on columellar and parietal portions. Operculum oval, transluscent, with terminal nucleus, shifted to left. Periostracum tightly adhering, beige to yellowish. Shell orange to brownish beige, siphonal canal and columella lighter, often whitish. Radula (Figures 33–34) [narrow (~ 55 μm wide, 1.7% of AL),] short. Lateral teeth with long basal plate with elongated outer edge and two strong, curved cusps, inner one slightly shorter. Basal plate of central tooth nearly square, with shallow

notch in anterior margin to accommodate cusp or adjacent tooth, and one strong, long medial cusp emanating from posterior edge. Small denticle on left side of cusp.

Remarks: Strebel (1908) attributed only varietal status to this taxon. We regard *Falsimophnia minor* to be a distinct species, differing from *F. andersssoni* in having more pronounced, wider and more broadly spaced axial ribs, and far less distinct spiral sculpture. The morphology of the radula, which is nearly identical to that of *F. albozonata* and *F. fulvicans*, confirms the placement of this species in the buccinulid genus *Falsimohnia*.

Conchologically, *F. minor* resembles some specimens of *Chlanidotella modesta* (Martens, 1885) from South Georgia, but differs in its smaller shell size and radular morphology. In *C. modesta* the lateral teeth have 4–5 cusps and the central tooth bears three distinct cusps of similar size (Powell, 1951: fig. L80; unpublished observations).

Distribution: South Georgia, Bellinghausen Sea, Peter I Island, 90–310 m.

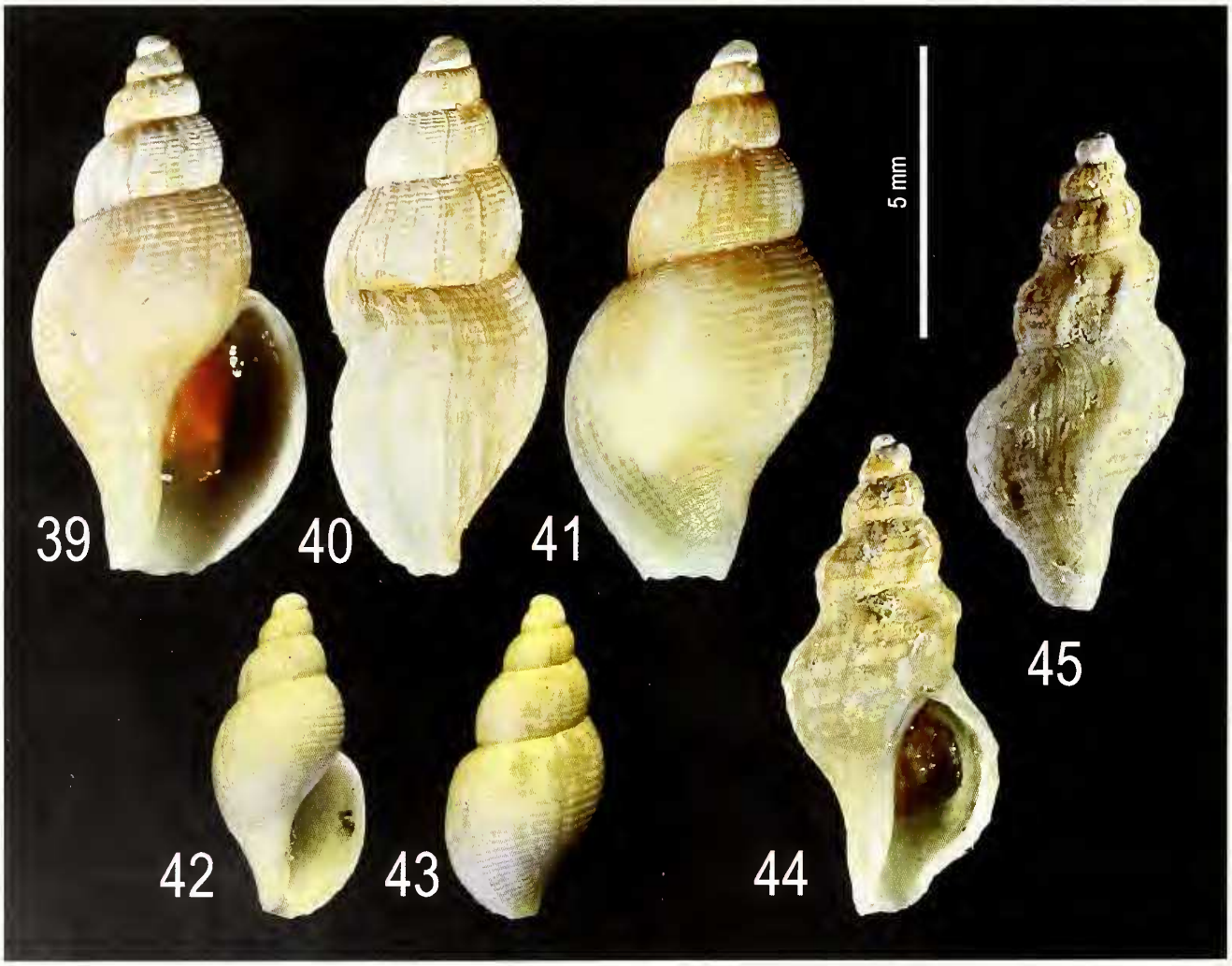
***Falsimohnia anderssoni* (Strebel, 1908)**
(Figures 39–41)

Bela anderssoni Strebel, 1908: 14–15, Taf. 2, fig. 24 a–d; Mellvill and Standen, 1912:355; Powell, 1951: 56; Engl, 2012:180–181, pl. 73, fig. 6b.

Type Locality: SE of Seymour Island, 64°20′S, 56°38′W, 150 m, Swedischen Südpolar-Expedition, sta. 5.

Holotype: SMNH Type-1063.

Description: Shell small (to 9.4 mm), fusiform, thick, with evenly rounded, convex whorls and short broad canal. Protoconch bulbous, eroded. Axial sculpture of low, very narrow, slightly sinuous ribs (19 on penultimate



Figures 39–45. Species of *Falsimohnia* and *Strebela* new genus. **39–43.** *Falsimohnia anderssoni* (Strebel, 1908). **39–41.** Holotype (SMNH Type-1063) (SL 9.4 mm). **42–43.** USNM 870245, off Elephant Island, South Shetland Islands, 220–240 m. **44–45.** Type species of *Strebela* new genus: *Bela notophila* Strebel, 1908, holotype, (SMNH Type-1064), (SL 8.1 mm). (radula extracted).

whorl) most pronounced on spire whorls, and raised growth striae that are prevalent on final whorl. Spiral sculpture of low, rounded, closely spaced spiral cords (14 on penultimate whorl, ~30 on final whorl) that are wider than intervening spaces. Aperture large (AL/SL = 0.56), broadly elliptical, (AL/AW ≈ 1.9), inner lip with narrow callus on parietal and columellar portions. Operculum oval, transparent, with terminal nucleus shifted to left, about half of aperture length. Periostracum beige, peeling. Shell beige, lighter than periostracum. The radula of the holotype was not examined.

Remarks: The shell shape and sculpture of *Falsimohnia anderssoni* are similar to those of *F. albozonata* and *"Pareuthria" innocens* (Smith, 1907) with which it may be confused [see discussion for comments regarding the generic reallocation of *Pareuthria innocens*]. *Falsimohnia anderssoni* differs from typical *F. albozonata* in its uniform beige shell color. It differs from *"Pareuthria" innocens* [syntype, BMNH, illustrated by Dell (1991), fig. 301 as "holotype"] in having a broader shell with more convex whorls, a wider aperture, more prominent spiral cords and low narrow axial ribs. We take a conservative approach in recognizing *F. anderssoni* as a distinct species, but more detailed studies as additional material becomes available may reveal that it represents a variation of either *F. albozonata* or *"P. innocens"*. Some authors (eg. Castellanos and Landoni, 1993) have considered *Falsimohnia anderssoni* to be a junior synonym of *?Bela michaelseni* Strebel, 1905 from off Patagonia, although *B. michaelseni* has a more slender shell with more pronounced axial ribs. However, there is little overlap between the gastropod fauna occuring within Antarctic Convergence and that of the Magellanic Province, even at the generic level (e.g., Harasewych et al., 2000; Harasewych and Kantor, 2004). Species originally believed to have a broad range spanning both Magellanic and Antarctic regions, generally on the basis of convergent shell morphology, are often shown to represent taxa referable to different genera and/or families when examined anatomically.

The geographic range of this species is extented to include the South Shetland Islands based on a specimen (USNM 870245) in the Smithsonian collections (Figures 42–43).

Distribution: SE of Seymour Island and Elephant Island, South Shetland Islands, 150–240 m.

DISCUSSION OF THE GENUS *FALSIMOHNIA*

We had earlier speculated (Harasewych and Kantor, 2004:42) that, based on opercular and radular morphology, *Antarctodomus okutanii* Numanami, 1996 may be referable to *Falsimohnia*, a view that was adopted by Engl (2012:145). Differences in radular morphology between *Antarctodomus okutanii* and *Falsimohnia albozonata*, the type species of *Falsimohnia*, most notably the lack of a long, tapered outer edge of the lateral teeth of *A. okutanii* as well as the broader placement of the cusps on the lateral teeth in this species, indicate to us that more research is needed for an accurate generic placement for this taxon.

Among the species described by Strebel (1908) as *Bela*, *B. notophila* Strebel, 1908 has been attributed to *Lorabela* (Powell, 1951; Zelaya, 2005) or conservatively retained in *Bela* (Engl, 1912). As with the species discussed above, the assignment of *Bela notophila* to the Conoidea has never been questioned. However, an examination of the radula obtained from the holotype of this species (Figures 37–38) undoubtedly places it within Buccinoidea. This taxon differs from all other Antarctic Buccinoidea in having a shell with axial sculpture of sinuous broadly spaced prosocline ribs. It is superficially similar to species of *Lorabela*, to which it was attributed by Powell (1951) when he established the genus *Lorabela*. The unique combination of radular and shell characters in this species necessitates the description of a new genus to include this species.

Genus *Strebela* new genus

Type Species: *Bela notophila* Strebel, 1908.

Description: Shell small, (to 8 mm), strong, thick, fusiform, with convex whorls slightly angulated at shoulder, attenuated broad siphonal canal. Protoconch paucispiral, smooth. Axial sculpture of wide, broadly spaced, strongly prosocline ribs (8 on last whorl). Spiral sculpture of few low sharp cords. Aperture moderately broad, elliptical (~ ½ shell length). Operculum small, oval, with terminal nucleus. Radula with long bicuspid lateral teeth and unicuspid central tooth with nearly square basal plate.

Remarks: This new genus differs from *Falsimohnia* in having a shell with a distinct, angulated shoulder, pronounced, widely spaced and strongly prosocline axial ribs, stronger and fewer spiral cords, and a well demarcated siphonal canal. The lateral teeth of the radula of *Strebela* have a thin basal plate, and two thin cusps that are broadly spaced, emanating from the inner and outer ends of the basal plate. Lateral teeth of *Falsimohnia* are or comparable length but much thicker and stouter. The two cusps are broader, and emanate from near the center and inner ends of the basal plate, which has a tapering outer edge.

Etymology: This new genus honors Hermann Strebel in recognition of his pioneering studies of Antarctic and subAntarctic Mollusca collected by the Swedish Antarctic Expedition (1901–1903). It is a combination of the name Strebel with the genus name *Bela*, to which he originally assigned the type species.

Strebela notophila (Strebel, 1908)

(Figures 37–38, 44–45)

Bela notophila Strebel, 1908: 20–21, Taf. 2, fig. 28 a–d; Engl, 2012:181, pl. 73, fig. 5.

Lorabela notophila—Powell 1951: 171, fig. N, 144; Zelaya, 2005: 128.

Type Locality: South Georgia, outer Cumberland Bay, 54°11′S, 36°18′W, 252–310 m, Swedischen Südpolar-Expedition, sta. 34.

Holotype: SMNH Type-1064

Description: Shell medium-sized (to 8.1 mm), strong, thick, fusiform, with convex whorls, angular shoulder, and attenuated siphonal canal slightly recurved to left, demarcated by a shallow notch. Protoconch broken in holotype. Whorl profile below suture slightly concave on penultimate and last whorls. Axial sculpture of pronounced, wide, broadly spaced, sinuous, strongly prosocline ribs (8 on last whorl) that extend from suture to suture on spire, becoming obsolete on last whorl at transition to siphonal canal. Spiral sculpture of low, narrow, widely spaced, well-defined cords (4 on penultimate whorl, 7 on the last whorl), absent on subsutural rim, distinct on the shell periphery, nearly obsolete on the siphonal canal. Aperture elongated (AL/SL ~ 0.47), narrow (AW/AL ~ 0.40), elliptical, with narrow callus along parietal and columellar regions. Siphonal canal well defined, anal sinus not pronounced. Operculum small (~ 0.5 AL), thick, ovate, with terminal nucleus shifted to left. Shell beige in color, siphonal canal whitish. Radula (Figures 37–38) narrow (~ 80 µm wide, 2.1% of AL). Lateral teeth with long, thin basal plate, two narrow, broadly spaced curved cusps (one at each end of the basal plate), inner one slightly shorter. Basal plate of central tooth nearly square, weakly notched anteriorly, with one thin, long, medial cusp emanating from posterior edge.

Distribution: South Georgia, 97–310 m.

Remarks: Powell (1951: fig. 114) illustrated the protoconch of this species, showing it to be smooth and paucispiral.

DISCUSSION

Within the Neogastropoda, a number of taxa unrelated to Conoidea were originally described in genera belonging to one of the "turrid" families on the basis of convergent shell morphology, among them species later found to belong to the genera *Exilia* (Ptychatractidae), *Antimitra* (Buccinidae), and *Daphnellopsis* (Muricidae). Conversely, some taxa originally described as buccinoideans have been shown to be referable to Conoidea when their anatomy was examined (e.g., Kantor and Harasewych, 1999).

Conchologically the species transferred here to *Falsimohnia* are similar to several Antarctic species that have been attributed to *Pareuthria* Strebel, 1905. They share a similar elongate-oval shell with a large, smooth protoconch and weak axial sculpture.

The genus *Pareuthria* Strebel, 1905, contains 20 species [WoRMS (Bouchet and Rosenberg, 2012)], of which only five [*P. innocens* (Smith, 1907), *P. plicatula* Thiele, 1912, *P. valdiviae* (Thiele, 1925), *P. turriformis* Egorova, 1982; *P. hoshiaii* Numanami, 1996], have been recorded within the Antarctic Convergence. The majority of the species of *Paraeuthria*, including the type species (*Fusus plumbeus* Philippi, 1844, by subsequent designation, Tomlin, 1932) are limited to the Magellanic Province. Radulae of the type species *Pareuthria plumbeus* (G. Pastorino, personal communication), and of two other Magellanic species, *P. fuscata* (Bruguière, 1789) and *P. venustula* Powell, 1951 (Powell, 1951: figs. 69, 70), have a broad central tooth with three cusps that are similar in size, and lateral teeth with two cusps (outer cusp longer) that lack a lateral extension along the outer margin of the basal plate.

Pareuthria innocens (Smith, 1907), a species with its type locality in the Ross Sea (Hut Point, McMurdo Sound, in 45–54 m) and with a circum-Antarctic distribution at depths of 6 to 549 m, was originally described in the conoidean genus *Thesbia* Jeffreys, 1867. It was subsequently transferred to the genus *Pareuthria* on the basis of its buccinoidean radula by Thiele (1912: 207), who provided an illustration (Thiele, 1912: pl. 16, fig. 22) that showed bicuspid lateral teeth and a tricusip central tooth. Egorova (1982: fig. 50) showed this species to have a central tooth with a single, median cusp. Hain (1990: 55) noted the differences in these figures, and provided an SEM image of the radula from a specimen he attributed to *P. cf. innocens* (Hain, 1990: pl. 22, fig. 7) in which the central tooth has a single, median cusp, but lateral teeth have two thin cusps situated at the ends of a basal plate that lacked a lateral extension. Numanami (1996: fig. 121C) published a SEM of the radula that clearly depicts a central tooth that is narrow, with a single, median cusp that is flanked by small denticles. The lateral teeth have two thick cusps as well as outer lateral projections. These reports indicate that either there is great morphological variability in the radula of this taxon, or that specimens representing more than one species contributed to these observations.

Pareuthria plicata Thiele, 1912, was described from the Davis Sea (Gauss station, in 385 m) and differentiated from *P. innocens* on the basis of shell sculpture. Engl (2012: 149) noted that this species was based on 24 variable syntypes, and designated a lectotype (Engl, 2012: pl. 54, fig. 3a). Hain (1990: pl. 22, fig. 8) published a SEM of the radula of a specimen identified as *P. cf. plicata* that was very similar to his image of the radula of *P. cf. innocens*. The squarish basal plate and long, medial cusp of the central tooth were more prominent, while the lateral teeth also had two, widely separated cusps that lacked outer lateral projections.

Pareuthria hoshiaii Numanami, 1996, is presently known only from its holotype, collected at Günnerus Bank near Syowa Station (Queen Maud Land) at 288 m. Its radula (Numanami, 1996: fig. 125D) has a central cusp with a single, broadly triangular cusp flanked by one or more pronounced denticles on each side. Lateral teeth have two thick cusps and an outer lateral projection.

Two additional species attributed to *Pareuthria*, *Enthria* (*Pareuthria*) *valdiviae* Thiele, 1925, from unspecified depths (Valdivia Station 160) off Kerguelen Island, and *Pareuthria turriformis* Egorova, 1982, from off the Shackleton Ice Shelf, Davis Sea at depths of 460 m, were described solely on the basis of shell morphology, and their radulae remain unknown.

Of the five species attributed to the genus *Pareuthria* that occur within the Antarctic Convergence for which radular morphology is known, it is clear that the radulae of *Parenthria innocens* and *P. hoshiaii* differ from that of *P. plumbeus*, the type species of the genus. They more closely resemble the radulae of species of *Falsimohnia*, including *F. albozonata*, the type species, most notably in having a central tooth with a squarish basal plate and single prominent medial cusp (that may be flanked by denticles) as well as lateral teeth with a long basal plate with a tapering outer edge, and two thick cusps along the inner 2/3 of the tooth. We therefore transfer the taxa *Pareuthria innocens* (Smith, 1907) and *P. hoshiaii* Numanami, 1996 to the genus *Falsimohnia*. The resulting binomina are *Falsimohnia innocens* (Smith, 1907) **new combination** and *Falsimohnia hoshiaii* (Numanami, 1996) **new combination.**

The new genus *Strebela* is characterized by radula similar to that of *Falsimohnia*, but differs in having a central tooth with a squarish basal plate that appears thinner, with less well defined lateral edges, a more shallowly concave anterior that lacks an indentation for the cusp of the anteriorly adjacent tooth, and a thinner median cusp emerging from the posterior tooth margin. The lateral teeth have a narrower basal plate with two much thinner and longer cusps that are broadly spaced. The outer cusp emerges from the outer margin of the lateral tooth, which lacks the lateral projection.

A radula with this morphology was reported for *Pareuthria plicatula* [Hain, 1990: pl. 22, fig. 8 (as *Pareuthria cf. plicatula*); Numanami, 1996: fig. 123D], as well as for a specimen identified as *Parenthria cf. innocens* (Hain,1990: pl. 22, fig. 7). However, there are conspicuous differences in shell morphology between *Strebela notophila* (strongly shouldered shell with 8 prominent, sinuous and strongly prosocline axial ribs and pronounced, widely spaced spiral cords) and *Parenthria plicatula* (shell with rounded shoulder, ~ 40 thin, weakly sinuous, nearly orthocline axial ribs and lack of pronounced spiral sculpture). The appropriate generic allocation of *"Pareuthria" plicatula* is not yet clear, but major differences in radular morphology exclude it from the genus *Parenthria*.

The remaining two species from within the Antarctic convergence that have been attributed to *Parenthria* are known only from their shell morphology. *Pareuthria valdiviae* (Thiele, 1925), from Kerguelen Island was collected with *Falsimohnia albozonata*, which it resembles in shell morphology, but has more pronounced axial striae and lacks the whitish band across the periphery. *Pareuthria turriformis* Egorova, 1982 from the Ross Sea, was attributed to the genus with doubts, as it differs in shell morphology from both the Magellanic species of *Parenthria* and from *Falsimohnia*.

A review of the buccinoidean genera of the Antarctic and Magellanic regions (Harasewych and Kantor, 2004: Appendix 1) revealed only three genera that are represented by species in both regions: *Metenthria* Thiele, 1912, *Pareuthria*, and *Falsitromina* Dell, 1990. Results of the present study dispute the occurrence of the genus *Parenthria* within the Antarctic Convergence, and suggest that both *'Pareuthria' valdiviae* and *'P.' turriformis* will be referred to other genera when anatomical material becomes available. A more detailed study of *Metenthria* and *Falsitromina* may reveal similar biogeographic patterns.

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